

## **TMPWG Guidance to SWGs on Review of ICCR Emissions Database November 7, 1997**

### **Background and purpose**

Several Source Work Group (SWG) and Coordinating Committee members have suggested that the Testing and Monitoring Protocol Work Group develop generic guidelines to assist in the evaluation of the ICCR Emission Database (database). The logic was that this may help standardize the process and ultimately lead to reduced effort on the part of the SWGs. As always, TMPWG believes that guidelines are not rules and should not be rigidly interpreted. With this understanding, we have provided the following guidance preceded by some insight on how the database was compiled.

### **How Database was made**

Since EPA has previously compiled much of the database, we began by looking at a summary of the methodology<sup>1</sup> EPA used. Apparently EPA/contractor reviewers documented the rationale for excluding data from any report. The summary of common reasons -- illegible results, report contained only summary data, comments from State or local agency indicate that report is inaccurate, or not enough data available to calculate emissions -- appear valid reasons for excluding the emission data. EPA included emission data from reports where some information was missing assuming that if in the future, that data were critical data, retrieval of the additional information could be attempted. TMPWG finds this a valid approach to building a database which may serve many future uses; omission of data from a database should not be done casually. To do so risks a biased database. There is always time to omit subsets of data as 'not good enough' later.

EPA chose to enter the emission data at the 'run' level and to input the data in basic measurement units (typically 'as measured' concentration) and to input, if available ancillary measurements of temperature, oxygen concentration, moisture, fuel type, and fuel usage rate as well as reported pollutant detection limits. With this information, it would be possible to later calculate, using stoichiometric relationships (EPA calls them F-Factors) emission rates in a multitude of formats (ppm, lb/mmBtu, lb/hr, etc.) electronically and consistently. For indirectly fired combustion units, this is a valid approach. For direct fired units where a significant percentage of (or variability in) either fuel or moisture is due to the process, there may be added fuel characteristics needed for that portion due to the process.

### **TMPWG Recommendations on Adding and Excluding Database Records**

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<sup>1</sup>September 22, 1997 Memorandum to Terry Harrison, EPA from Mary Lalley, ERG, "ICCR Emission Test Database, Procedures for Extracting Data From Emission Test Reports"

1. TMPWG recommends that the SWG review these exclusion records to assure that no potentially useful information was excluded and document agreement that none of the excluded data should be added.
2. If any are added, there should be similar documentation of why the initial decision was altered. In addition, if a significant portion of the initial exclusion decisions are changed, we recommend that the procedure be revised to be less restrictive.
3. Similar criteria should then be followed for adding additional existing emission data.

### **How did Combustion Turbine and Internal Combustion Engine SWGs review the Database?**

To formulate generic guidelines, the TMPWG reviewed the procedures already being implemented by the CT and ICE SWGs on the assumption that we should act as recorders of the process followed. We wanted to identify pitfalls and solutions found, or as a last resort offer suggestions, so that other SWGS learn from CT and ICE SWGs experiences and makes their learning curve steeper.

The common pitfall identified by CT and ICE SWGs seemed to be difficulty in finding sufficient process information in the database to decide under what conditions the emission test was conducted to potentially explain variations in reported results.

For evaluating a test report, CT and ICE SWG members decided if critical process data was available in the reports. For a large portion of the reports, the information was not there so, depending on who reviewed the test report for critical information; some reviewers had personal knowledge of a way to get missing process information or thought that it might be available and hence found a report acceptable while other reviewers with no means to access the process data recommended rejecting a report. The SWG then documented the rationale for the reviewer's recommendation on individual reports. The reviewers, in general, showed less inclination to look at the testing Quality Assurance Data (e.g., audits, calibrations, field, trip, lab, or reagent blanks) even if it were in the report, to assess emission data quality, so the default assumption seems to be that the test data, at least for the first cut, can be assumed to be correct. In the case where the CT and ICE SWGs heard opinions or saw evidence that there could be a systematic problem with application of particular test method at their source category, the TMPWG was consulted and ultimately issued guidance<sup>2,3</sup> on the possible effects of NO<sub>x</sub> on dinitrophenolhydrazine based aldehyde test method results and how to interpret reports of non-detects in test reports..

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<sup>2</sup>Formaldehyde Measurements by the DNPH Methods: A Review by the Testing and Monitoring Protocol Workgroup, available on the ICCR TMPWG Web Site as file 'formaldl.wpg'

<sup>3</sup>September 1997 TMPWG Guidance on Interpreting and Using Emissions Databases Containing Non-detection Values, available on the ICCR TMPWG Web Site as file 'tmdetect.pdf'

Following conclusions can be drawn from the SWG report review.

1. A clearer definition was made of the types of process information that should be recorded to properly define valid subgroups (or classes) of sources, and within each subgroup to define normal and abnormal process operation during future test programs. This was evident in their development and documentation of a draft test plan to fill data gaps.
2. Better understanding of when and how TMPWG may or may not 'add value' to the SWG deliberations.
3. Some time economy and potentially more consistent decisions made on quality of individual test reports could be gained if the SWG had written guidelines available for reviewers defining differing levels of report quality (TMPWG suggests at least 3: unacceptable, acceptable upon condition that additional data is obtained, and acceptable) as well as what process information must be available for each level of recommendation.
4. While perfectly fine to do, it is important to the ICCR process that decisions to exclude data be documented and maintained. It is especially important if the data appear on either the high or low tail of the bulk of the data.

### **TMPWG's Recommendations for Review of Emission Data Quality**

In summary, TMPWG recommends that SWGs first conduct a Tier 1 analysis which should include review of critical process data such as basic device information, fuel data flow rate and operating parameters. Tier 1 analysis is recommended only to reject emissions data or accept it further for an additional Tier 2 analysis of Quality Assurance Data such as test methods used, number of runs and precision and accuracy of the data. In other words, Tier 2 analysis should include a review of method specific QA of the crucial emissions data directly supporting decisions on numerical emission limits.

TMPWG does not suggest that all test reports undergo this rigorous and time-consuming process. However, TMPWG has provided a summary of these potentially available QA data below. Not all of this data is appropriate for all methods. We have arranged the list under 2 broad categories - instrumental onsite procedures and manual procedures where part of the sample is sent back to a laboratory for additional sample preparation and analytical finish. Realize that even within each category, not all these are applicable to all methodologies, and the significance of their absence in the report varies in importance depending on the pollutant, methodology, and other stack conditions. The TMPWG encourages the SWG seek TMPWG opinions on specific pollutant/methodologies but does not want to be a reviewer of all reports.

### **Tier 2 Analysis for QA Review of Emission Data**

Tester or Analyst/Testing Lab identified

Pollutant Tested (Specific HAP/Criteria Pollutant)

Concentration of Pollutant with units (3 runs preferred)

Detection Limit. ( If necessary, refer to TMPWG guidance document on “below detection limit data”).

Sampling procedure described?

Sample recovery described?

Reference test method used?

CARB

EPA

Other. Equivalent to either a CARB or an EPA method? Was there a satisfactory reason provided for using this method?

See if there was a criteria to use a certain method. For example, TMPWG has another document available on potential significance of NO<sub>x</sub> concentrations as possible interferant in different test methods on the reported formaldehyde emissions.

Quality Assurance Data

Number of Runs

Standard Deviation or Precision acceptable?

Method Accuracy checked? If so how?

Surrogate Recoveries within criteria?

Spike Recoveries within criteria?

Instruments calibrated?

Specialty gases meet specs?

Audit sample results available?

CEMS data (for criteria pollutants and fixed gases) available?

Any bias (positive or negative) found in results?

Results corrected for blank? (Blank correction procedure may not be specified in the method).

Note: The above documentation item list is not inclusive and also may not be applicable for some devices.

Recommendation

SWG reviewers use their own judgment about the acceptability of a test report. As mentined before, project objectives should be kept in mind so that test results are not rejected for minor defeciencies.

For further information, please contact Farhana Mohamed (310-524-9180) or TMPWG representative for your SWG.